

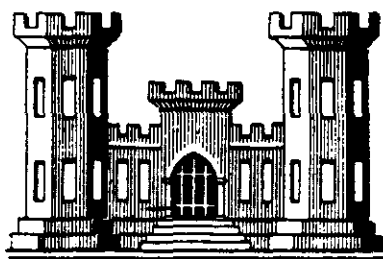
CONNECTICUT RIVER FLOOD CONTROL

COLEBROOK RIVER DAM & RESERVOIR

WEST BRANCH, FARMINGTON RIVER
CONNECTICUT & MASSACHUSETTS

DESIGN MEMORANDUM NO. 11

PRELIMINARY PLAN FOR RESERVOIR DEVELOPMENT
(PART OF THE MASTER PLAN)



U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

APRIL, 1964

U. S. ARMY ENGINEER DIVISION, NEW ENGLAND

CORPS OF ENGINEERS

424 TRAPELO ROAD
WALTHAM, MASS. 02154

DRESS REPLY TO:
DIVISION ENGINEER

REFER TO FILE NO.

NEDED-R

30 April 1964

SUBJECT: Design Memorandum No. 11 - Preliminary Master Plan for Reservoir Development - Part of the Master Plan for Colebrook River Reservoir, Farmington River, Connecticut River Basin, Connecticut and Massachusetts

TO: Chief of Engineers
ATTN: ENGCW-O
Washington, D. C.

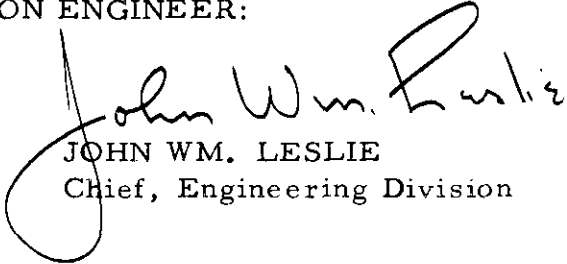
1. In accordance with EM 1110-2-1150, there is submitted, for your review and approval, Design Memorandum No. 11, Preliminary Master Plan for Reservoir Development - Part of the Master Plan for Colebrook River Reservoir, together with a copy of this letter bound in each copy of the memorandum.

2. The plan has been initiated to provide for maximum utilization of the reservoir by the public consistent with the resources of the area and the authorized purposes of the project.

3. Approval is requested.

FOR THE DIVISION ENGINEER:

Incl (quint)
Des Memo No 11


JOHN WM. LESLIE
Chief, Engineering Division

CONNECTICUT RIVER BASIN, CONNECTICUT
FARMINGTON RIVER WATERSHED
DESIGN MEMORANDUM NO. 11
PRELIMINARY MASTER PLAN
FOR
RESERVOIR DEVELOPMENT
PART OF THE MASTER PLAN
FOR
COLEBROOK RIVER RESERVOIR, CONNECTICUT & MASSACHUSETTS

This report, prepared in the Planning and Reports Branch of the Engineering Division, New England Division, has been coordinated with the Real Estate Division and is recommended for approval.


JOSEPH M. GEOGHEGAN
Chief, Real Estate Division

BIBLIOGRAPHY OF DESIGN MEMORANDA
COLEBROOK RIVER DAM AND RESERVOIR

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2	Hydrology		
	Preliminary	3 Jul 1963	10 Jul 1963
	Final	12 Nov 1963	19 Dec 1963
3	Site Geology		
4	Real Estate Design Memorandum		
5	Relocations	31 Mar 1964	
6	General Design Memorandum	31 Mar 1964	
7	Concrete Materials	27 Sep 1963	18 Oct 1963
8	Hydraulic Analysis	30 Apr 1964	
9	Embankments and Foundations		
10	Detailed Design of Structures		
11	Reservoir Development (Preliminary)	30 Apr 1964	
11A	Reservoir Development (Master Plan)		

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PRELIMINARY MASTER PLAN

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RESERVOIR DEVELOPMENT
COLEBROOK RIVER RESERVOIR

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COLEBROOK RIVER DAM AND RESERVOIR

PRELIMINARY MASTER PLAN

I. INTRODUCTION

1-01. Authorization

The Colebrook River Dam and Reservoir was authorized by the Flood Control Act of 1960 (Public Law 86-645, 86th Congress) as a part of the comprehensive plan for flood control in the Connecticut River Basin. Authorization of the comprehensive plan is contained in the Flood Control Act of 1938 (Public Law 761, 75th Congress, 3rd Session), as amended.

The project provides for water supply for the Metropolitan District Commission, Hartford County, Connecticut in accordance with the provisions of the Water Supply Act of 1958 (Public Law 85-500, 85th Congress, 1st Session).

Authorization for development and use of the reservoir areas for public recreational and other purposes is contained in Section 4 of the Flood Control Act of 1944 (Public Law 534, 78th Congress, 2nd Session), as amended.

This preliminary plan for reservoir development and management has been prepared in accordance with EM 1130-2-302, Planning and Administration of Project Lands and Waters, and related manuals.

1-02. Scope of Report

This report presents a preliminary plan to serve as a guide in the subsequent program for the development, management and use of the Colebrook River Reservoir for public purposes which are compatible with the authorized project purposes. This report presents a description of the project, factors affecting recreational activities, sites selected for public use and access, views of other agencies, and preliminary estimates of cost for reservoir development.

1-03. Maps

The four maps incorporated in this report depict the geographic areas in which the project is located, significant public recreation areas within 40 miles of the project and reservoir features including proposed development plan. Reservoir maps are based on aerial photogrammetry at a scale of 1" = 500' with a contour interval of 5 feet. Additional detailed site topography will be required.

II. DESCRIPTION OF AUTHORIZED PROJECT

2-01. Purpose

The project will be a flood control reservoir with water supply storage. The Hartford County Metropolitan District Commission has given assurances, dated 3 December 1962, that it will bear the required costs of water supply, as provided in EM 1165-2-105. The flood control and water supply pool will be in addition to the present water supply storage of the West Branch Reservoir formed by Goodwin Dam which has a spillway crest at elevation 641 ft. m.s.l.

2-02. Location

Colebrook River Dam and Reservoir will be located on the West Branch Farmington River in the Town of Colebrook, Litchfield County, Connecticut. The damsite is about 3.9 miles upstream from the confluence with the Still River at Riverton, Connecticut. The reservoir will extend upstream along the West Branch Farmington River about 5.9 miles and into the Towns of Tolland and Sandisfield, Massachusetts. The dam is about 1.5 miles upstream from Goodwin Dam, formerly known as Hogback Dam. The location of the project is shown on Plate 1.

2-03. Accessibility

The project area is readily accessible over a good highway system to almost 1.8 million residents living within an hour's drive (40 miles) of the project. Connecticut and Massachusetts Routes No. 8, major state highways, parallel the project area, connecting with major east-west roads at Winsted, Connecticut, about 8 miles south and New Boston, Massachusetts, about 5 miles north. Access to the Massachusetts Turnpike at Lee, Massachusetts, is about 25

miles northwest and links the area to Berkshire County and upstate New York. Hartford, about 30 miles to the southeast, can be reached on U.S. Route 44. A section of Route 8 will be relocated to a higher elevation on the west side of the project. Part of the old road will provide access to various levels of the fluctuating water supply pool. New access roads will be constructed for operational purposes.

2-04. Project Status

It is anticipated that construction will begin in the spring of 1965 with completion scheduled for the spring of 1968.

2-05. Pertinent Data

The dam will be a rolled earth and rockfill structure 1285 feet long and 218 feet high above the streambed. An earth dike 1100 feet long and 49 feet high will be located on a saddle of land on the west side of the reservoir about 0.5 miles southwest of the damsite. The dike will also carry an access road about 0.6 miles in length from Connecticut Route 8 to the dam.

The top of the dam and dike will be at elevation 785 m. s. l. A chute-type spillway with ogee weir will be located on the east abutment of the dam with crest length 205 feet. The reservoir at spillway crest elevation 756 will cover 1150 acres providing 50,800 acre-feet equivalent to 8 inches of runoff from 118 square miles of drainage area. Water supply storage in the amount of 10 billion gallons or 30,700 acre-feet will be provided in addition to storage presently available in West Branch Reservoir.

The outlet works will consist of a 10-foot diameter concrete lined tunnel beneath the east abutment, discharging directly into the West Branch Water Supply Reservoir. A gate control tower with three gates will be located upstream of the dam. Gate sill elevation will be at 575 ft. m. s. l.

The maximum water supply pool at elevation 700 ft. m. s. l. will have a surface area of 705 acres. This pool will be built up in the spring and will be gradually drawn down starting on or soon after May 15 of each year with drawdown extending through the summer months. Initially, only the existing storage capacity of 11,000 acre-feet and that for immediate use 6200 acre-feet, will

be utilized for downstream riparian flows. As domestic requirements increase, the storage for future use will be utilized. A tunnel will be constructed from Goodwin Dam to Barkhamsted Reservoir to be followed by acquisition of riparian rights. At such time as substantial amounts of the stored water are diverted and subject to approval of the Board, the District will maintain 5,000 acre-feet of holdover storage in the Colebrook River Reservoir. This will result in a reasonably permanent minimum pool at elevation 621 subject to drawdown only in emergencies. Management and stocking of this pool will create a fishery to replace losses in the present downstream stream fishery which will result from the diversion of water.

2-06. Land Acquisition

More than 80% of the land required for this project is owned by the Hartford Metropolitan District Commission and the Connecticut State Park and Forest Commission. Easements will be taken over these lands for the various purposes required to meet the needs of the project.

The guide taking line on the lands in these two ownerships that are within the reservoir area is to be 785 ft. m.s.l. (top of dam) which will provide for the surcharge of 24 ft. with 5 feet of freeboard.

A guide taking line at elevation 766 ft. m.s.l. is proposed for privately-owned lands, principally in Massachusetts. This elevation is based on the occurrence of a standard project flood with the reservoir pool at elevation 761 ft. m.s.l. as shown in paragraph 12c of Design Memorandum No. 2, Hydrology, with a freeboard allowance of 5 feet. These lands will be purchased in fee except when it will be to the financial advantage of the government to acquire a flowage easement.

No provision is made for the acquisition of lands within 300 ft. horizontally of the static full pool elevation in accordance with current policies expressed in EM 405-2-150. The Metropolitan District lands in Connecticut are open for public access for hunting, fishing and boating under Connecticut state law. The rights to be obtained from the Hartford Metropolitan District Commission over lands within the Commonwealth of Massachusetts which the Commission owns will include the right of free public access for hunting, fishing and boating. The acquisition of

additional privately-owned land in Massachusetts is considered unnecessary as the reservoir pool will be intermittent and subject to drawdown, thereby being unsuited for collateral usage.

Under the above program of acquisition, it is estimated that 1625 acres of land will be required for the project, of which about 1350 acres will be in easements for flowage and construction purposes. About 250 acres of privately-owned land at the upper end of the reservoir in Massachusetts and about 25 acres of privately-owned land in Connecticut will be purchased in fee. The real estate map will be included in the master plan. The relocation of Connecticut and Massachusetts Route 8 on the west side of the reservoir will be on land now owned by the Metropolitan District or by the State of Connecticut, except for 0.5 miles in Massachusetts for which easements will be required.

III. FACTORS AFFECTING RECREATIONAL ACTIVITIES

3-01. Existing Public Recreation Areas

The three states within an hour's drive (40 miles) of the project provide parks, reservations, forests, and other recreation areas for the public. Plate No. 2 shows the location of significant existing public recreation areas and available facilities within a 40-mile radius of the project area.

3-02. Population

The number of persons residing within 40 miles of the project has been recorded at about 1,775,000 by the 1960 U.S. Census. The Hartford Metropolitan area with a population of 525,000 is 25 miles from the project. This region of Connecticut and Massachusetts has had a population growth of about 21.5 percent between 1950 and 1960.

3-03. Anticipated Public Use

Based on analysis of population and trends within 40 miles of the project; analysis of use at other similar NED reservoirs; potential inherent in large summer tourist influx; statistics on fisherman use in the area; the attraction of the dam, and accessibility, it is estimated that the project area will receive a visitation of 100,000 people within 5 years after project completion. Of this 100,000 there will be 50,000 fishermen, 40,000 sightseers to view the dam and 10,000 seeking leisurely uses such as hiking, nature walking and hunting.

3-04. Project Resources

The Colebrook River Reservoir is a dual-purpose project providing for flood control and immediate and future water supply for the Hartford Metropolitan District. A minimum flow of 50 cfs will be released from the downstream West Branch Reservoir at all times in accord with State legislation. All inflows of 150 cfs or less will be passed through the reservoirs. Only flows in excess of 150 cfs will be stored. Public fishing, hunting and boating on Metropolitan District lands are specifically provided for by legislation authorizing the West Branch Reservoir, Connecticut Special Act of 1948, Sec. 12, No. 444, later amended to include Colebrook River Reservoir. Similar opportunity will be provided in the Massachusetts portion of the project lands.

The flood control pool, when filled to spillway crest elevation 756, will impound waters to a depth of 184 feet at the dam and will inundate about 1150 acres. This flood pool will be about 6 miles in length. Although it is recognized that a flood may occur at any time of the year in the precipitous river basins of New England, the major use of flood storage will be in the spring of the year with release of the impounded floodwaters occurring as rapidly as downstream conditions and channel capacities permit. Experiences over the past 20 years in the operation of other flood control reservoirs in New England indicates that the recreation resources of the reservoirs are available for uninterrupted use during most of the summer, fall and winter seasons. Experience has further shown that important benefits accrue from boating, fishing and hunting, preservation of fish and wildlife, forestry management and other uses without detracting from the flood control benefits which will result from the reservoirs. It is therefore concluded that this project is suitable for the development and use as proposed in this Preliminary Master Plan.

Dams and structures have been a major attraction to the visiting public, especially where they are accessible over good roads. An overlook at Colebrook River Dam with facilities for parking and sightseeing will provide for the public at this area. Hunting is popular in the vicinity and, with safety precautions for other uses, the area will be open to public hunting. Public access for fishing, hunting and boating will be provided. Fishing in Colebrook River Reservoir would offset any losses caused by the inundation of the stream at the site. The detrimental effect of the

project on wildlife resources will not be significant. Additional recreation facilities, especially boat-launching ramps, will be provided. It is concluded that the water supply pool will provide a good opportunity for shore and boat fishing. At certain times of the year, especially in the spring and fall, the scenic qualities of the reservoir will attract many people driving for pleasure. Facilities will be provided to meet the types of recreational use for which this area is best adapted. Swimming will not be provided because this activity is at the present time prohibited by law in a water supply reservoir.

IV. COOPERATING AGENCIES

4-01. FEDERAL AGENCIES

a. Department of Health, Education and Welfare, Public Health Service. In a report dated 10 January 1964, this Department found no tangible benefits to be derived from the inclusion of storage for streamflow regulation for quality control.

b. Fish and Wildlife Service. This agency has furnished a conservation and development report dated 12 February 1964 which concluded that the reservoir area generally will have benefits which offset a major part of the losses due to the project if a holdover storage pool of 5000 acre-feet is made available as a fishery resource. They recommended access to the reservoir be provided for fishermen from both Connecticut and Massachusetts shores, including parking for 350 cars and construction of two launching ramps. Comprehensive consideration will be given to the report and those recommendations adaptable contained therein will be included in the Master Plan.

c. National Park Service. Region Five of the National Park Service commented on the project in a letter dated 23 November 1959 which concluded that general recreation values of the reservoir area would be minor due to fluctuation of the water supply pool and stipulations made by the Metropolitan District Commission on use of the water.

4-02. STATE AGENCIES

a. Connecticut Water Resources Commission. Various meetings were held with the State Water Resources Commission, the coordinating agency for the State in State-Federal affairs. The Commission has approved the multi-purpose project and supported legislation providing for inclusion of the water supply as being in the best interest of the State.

b. Connecticut Board of Fisheries and Game. This agency participated in the development of the report of the U.S. Fish and Wildlife Service. However, they do not concur that satisfactory mitigation of fishery losses could be accomplished by use of a holdover storage pool and feel that mitigation could only be obtained by inclusion of an independent fishery pool. The Board, which appoints a member to the seven-man commission to administer recreation on District lands, is permitted by law to develop Colebrook River Reservoir in accordance with Special Acts of 1949, Sec. 12, as amended, which provides for hunting, fishing and boating. This program will be developed for inclusion in the Master Plan.

c. The Connecticut Park and Forest Commission. This agency has indicated interest in the most comprehensive use possible of the public recreation resources of the project. Where easements are required on land owned and managed by this Commission, full cooperation has been assured to grant flowage easements or to manage the lands specified by Connecticut Special Acts of 1949, Sec. 12.

d. Metropolitan District Commission. This Commission has given assurances to maintain a 5000 acre-foot pool for mitigation of fishery losses subject to approval by the District Board. This pool created by holdover storage would be maintained as a reserve for emergency use only and would only be drawn down in years of extreme drought.

e. Massachusetts Water Resources Commission. This agency represents the Commonwealth of Massachusetts in planning for water resource development projects. It endorsed the Colebrook River Project and recommended a stable level at Otis Reservoir in Otis, Massachusetts, during the recreation season, June 1st to October 1st each year. Otis Reservoir was constructed by the Farmington River Water Company to make water available at dry periods to downstream plants along the Farmington River in Connecticut. Operation to maintain a stable summer level in Otis Reservoir can be achieved by exchange of storages between Otis and Colebrook River reservoirs. Such operation is provided for under the present riparian agreement, and a further agreement between the Commonwealth acting through its Department of Natural Resources and the Farmington River Water Power Company is being negotiated.

f. Massachusetts Division of Fisheries and Game. This agency participated in, and concurs with, the report of the Fish and Wildlife Service. It is prepared to undertake a fish and wildlife management program under suitable license agreement at such time as other interests and uses shall be resolved. This program will be developed for inclusion in the Master Plan.

g. Massachusetts Department of Natural Resources. This agency has indicated interest in the most comprehensive use possible of the public recreation resources of the project and the subsequent management of state forests within the watershed. Further studies of the forest resources will be included in the Master Plan.

V. SITES SELECTED FOR PUBLIC USE

5-01. General

The entire reservoir area, exclusive of the flood control and water supply structures, is proposed for use as a hunting, boating and fishing area within the meaning of Connecticut Special Act of 1948, Sec. 12, No. 444, as amended. The Metropolitan District is directed to permit access and construction of facilities and improvements to enhance these recreational activities subject to regulation by the seven-member commission. The Corps will provide parking areas, sanitary facilities and access to the dam-site in the most economical manner. Additional facilities and

improvements in the reservoir area will be suitably located and in such a way as to preserve the water quality. Plate No. 3 shows the location and approximate limits of these areas.

5-02. Vicinity of Dam

Parking, sanitary facilities and an observation area are being provided as part of project construction for the accommodation of the visiting public at the dam.

5-03. Existing Access Area

The area three miles upstream of Goodwin Dam presently serves as access to the West Branch Reservoir. It is readily accessible by Connecticut Route 8 and has sanitary facilities, car and trailer parking, and a boat launching ramp. Upon completion of the Colebrook River Reservoir, this existing area will remain and provide access to pool elevation from 610 ft. msl to 640 ft., msl. The sanitary facilities would be removed as they would create a source of pollution to pools above 640 ft. msl.

5-04. Access Area No. 1

This area, accessible by existing Connecticut Route 8, will have provisions for car and trailer parking and a boat launching ramp. Pools from elevation 640 ft. msl to 680 ft. msl will be accessible from this area.

5-05. Access Area No. 2

This area, also accessible by Connecticut Route 8, will have provisions for car and trailer parking and a boat launching ramp. Pools from elevation 680 ft. msl to 700 ft. msl will be accessible from this area.

5-06. Access Area No. 3

Upon construction of the Colebrook River Dam, access via the existing access area to the portion of the West Branch Reservoir downstream of the new dam will be excluded. To provide access to this portion of the reservoir an existing maintenance road will be utilized. Provisions will be made for car and trailer parking and boat launching.

VI. COST ESTIMATE

6-01. Cost Estimate

The preliminary estimate of the initial cost is based on development of basic facilities by the Federal Government. These facilities will generally conform to criteria set forth in EM 1130-2-312, including change 1, dated 1 August 1961. A summary of proposed facilities and estimated costs are shown below.

Access Area No. 1

Gravel Parking Area 5000 s.y. @ \$3.00/sy	\$ 15,000
Bituminous Concrete Boat Launch Ramp-Job	4,000

Access Area No. 2

Gravel Parking Area 5000 s.y. @ \$3.00/sy	15,000
Bituminous Concrete Boat Launch Ramp-Job	2,000

Access Area No. 3

Gravel Parking Area 1250 s.y. @ \$3.00/sy	3,750
Bituminous Concrete Ramp	2,000

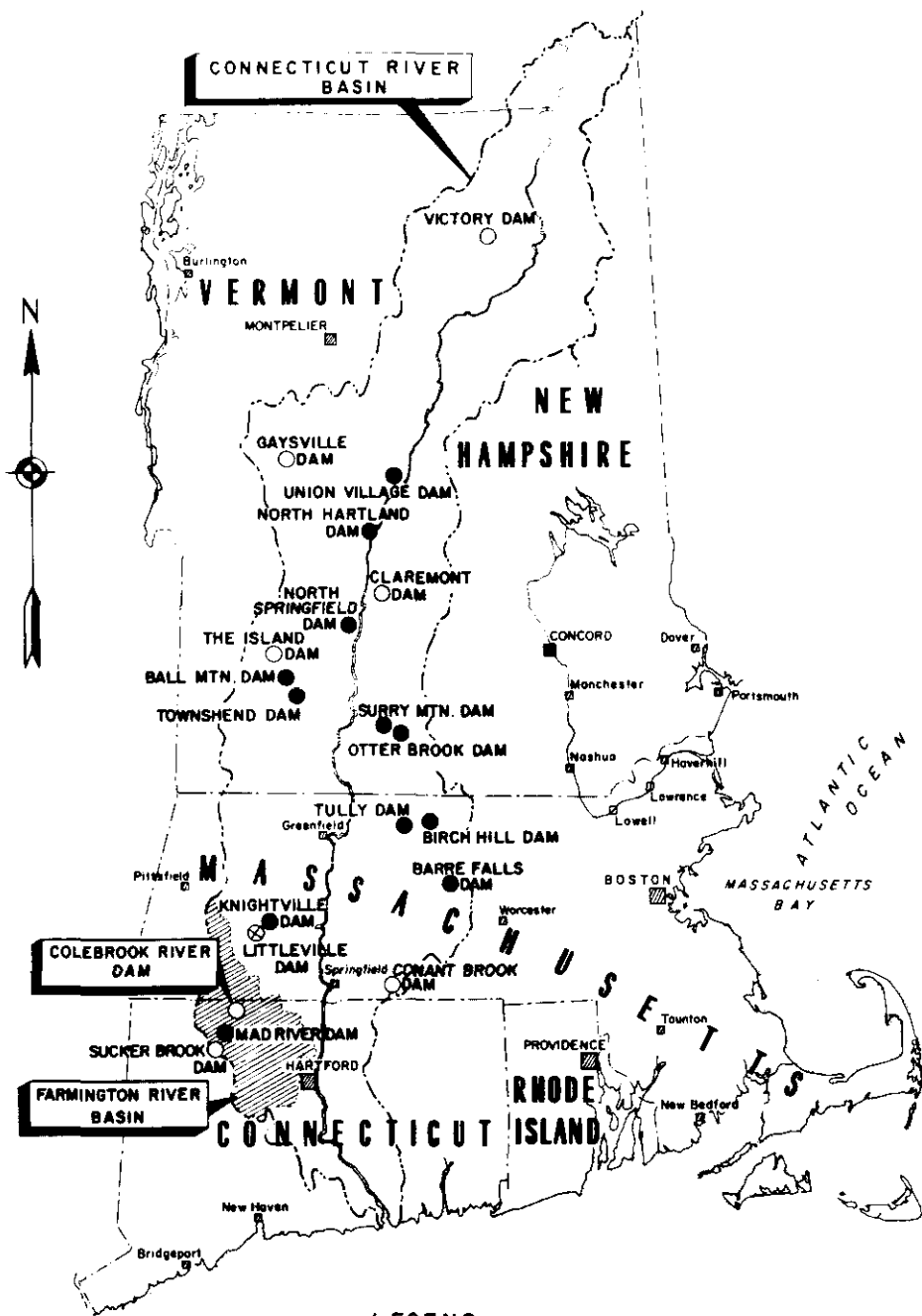
Contingencies	6,250
Engineering & Design & Supervision & Administration	<u>9,000</u>

TOTAL COST	\$ 57,000
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VII. CONSTRUCTION SCHEDULE

7-01. Construction Schedule

The development of the recreation area will be undertaken at such time as will be in the best interest of the government with respect to the authorized project construction contract. It is planned to have the facilities available for use by the spring season of 1968.



LEGEND

- RESERVOIRS COMPLETED -----●
- RESERVOIRS UNDER CONSTRUCTION -----⊗
- RESERVOIRS AUTHORIZED -----○
- CITIES -----■

CONNECTICUT RIVER FLOOD CONTROL
FARMINGTON RIVER BASIN

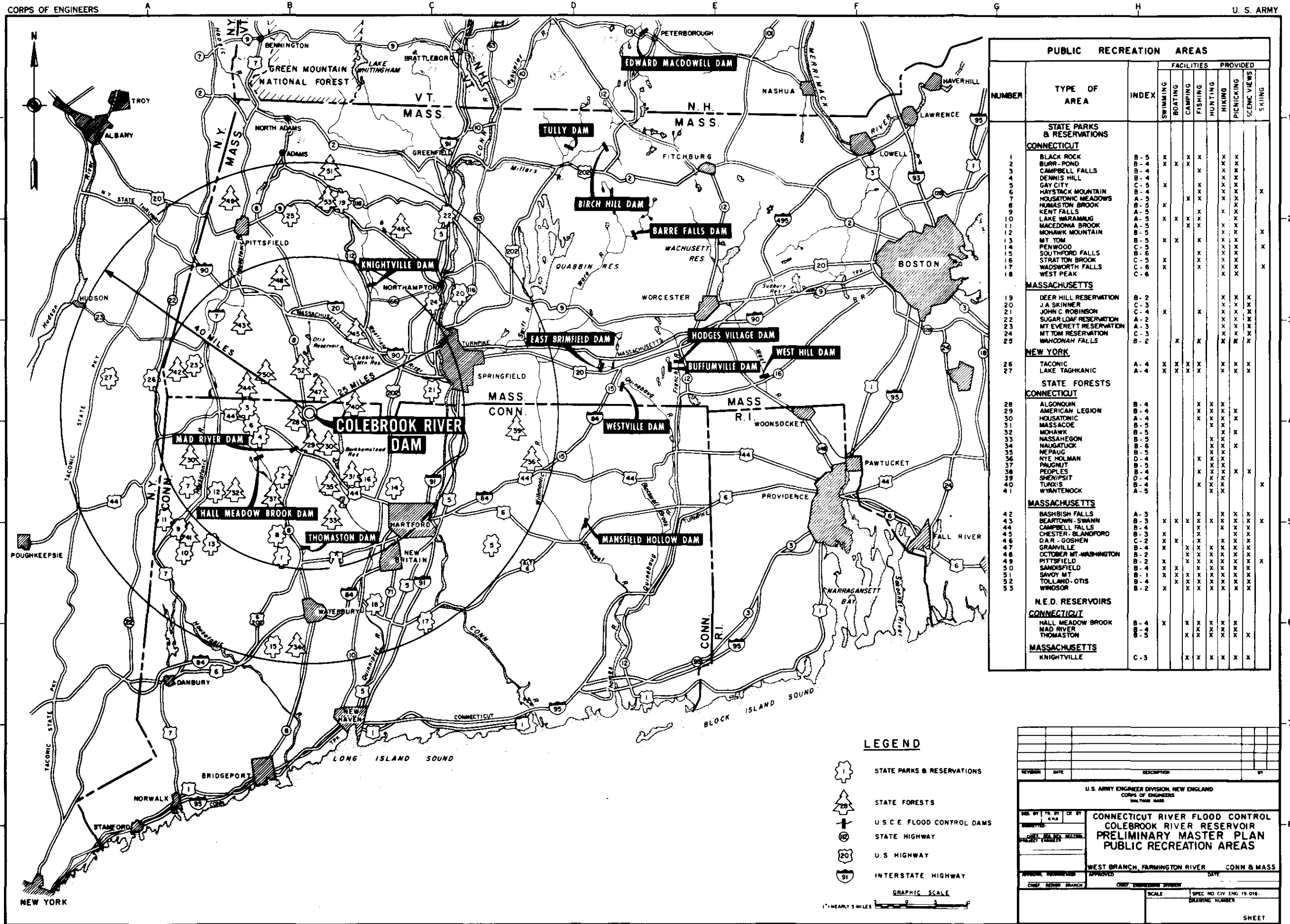
COLEBROOK RIVER RESERVOIR

WEST BRANCH FARMINGTON RIVER

PRELIMINARY MASTER PLAN FOR DEVELOPMENT

INDEX TO DRAWINGS		
DRAWING NO.	SHEET NO.	TITLE
	1	REGIONAL MAP & INDEX
	2	PUBLIC RECREATION AREAS
	3A	GENERAL DEVELOPMENT PLAN
	3B	GENERAL DEVELOPMENT PLAN

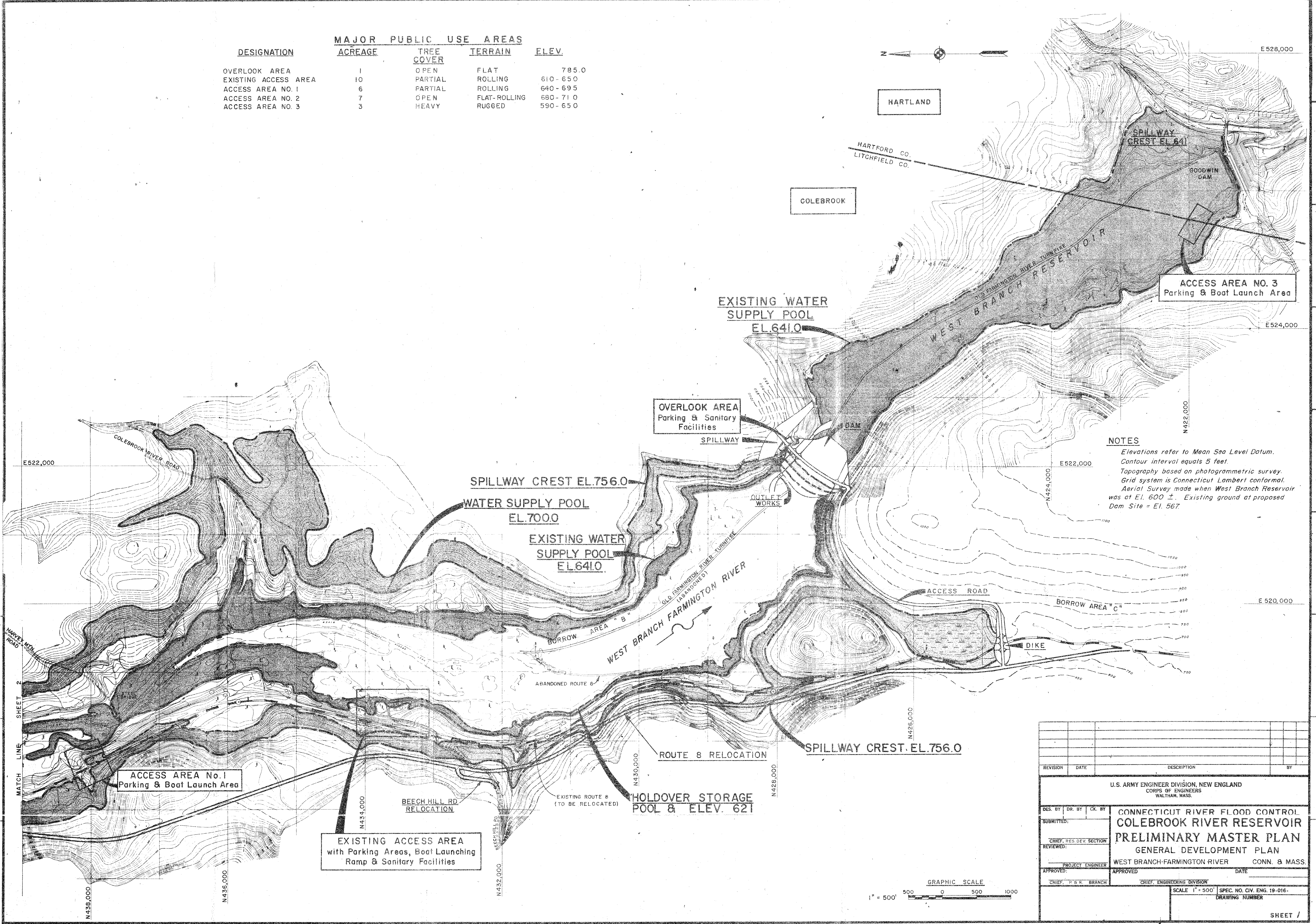
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U.S. ARMY ENGINEER DIVISION, NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.			
DR BY	TR BY	CR BY	
PROJECT ENGINEER			
SUBMITTED BY		APPROVED	
CHECK, PLANS & TYPE BRANCH		CHIEF ENGINEERING DIV.	
SCALE		SPEC. NO. CIV. ENG. - 10-018	
		DRAWING NUMBER	
		SHEET	



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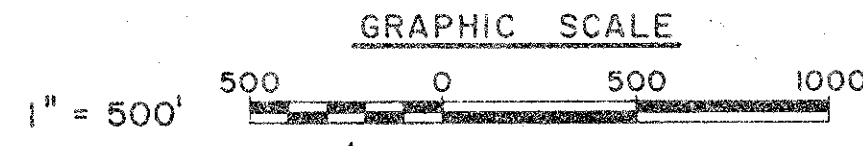
3A + 3B

MAJOR PUBLIC USE AREAS				
DESIGNATION	ACREAGE	TREE COVER	TERRAIN	ELEV.
OVERLOOK AREA	1	OPEN	FLAT	785.0
EXISTING ACCESS AREA	10	OPEN	ROLLING	610 - 650
ACCESS AREA NO. 1	6	PARTIAL	ROLLING	640 - 695
ACCESS AREA NO. 2	7	OPEN	FLAT-ROLLING	680 - 710
ACCESS AREA NO. 3	3	HEAVY	RUGGED	590 - 650

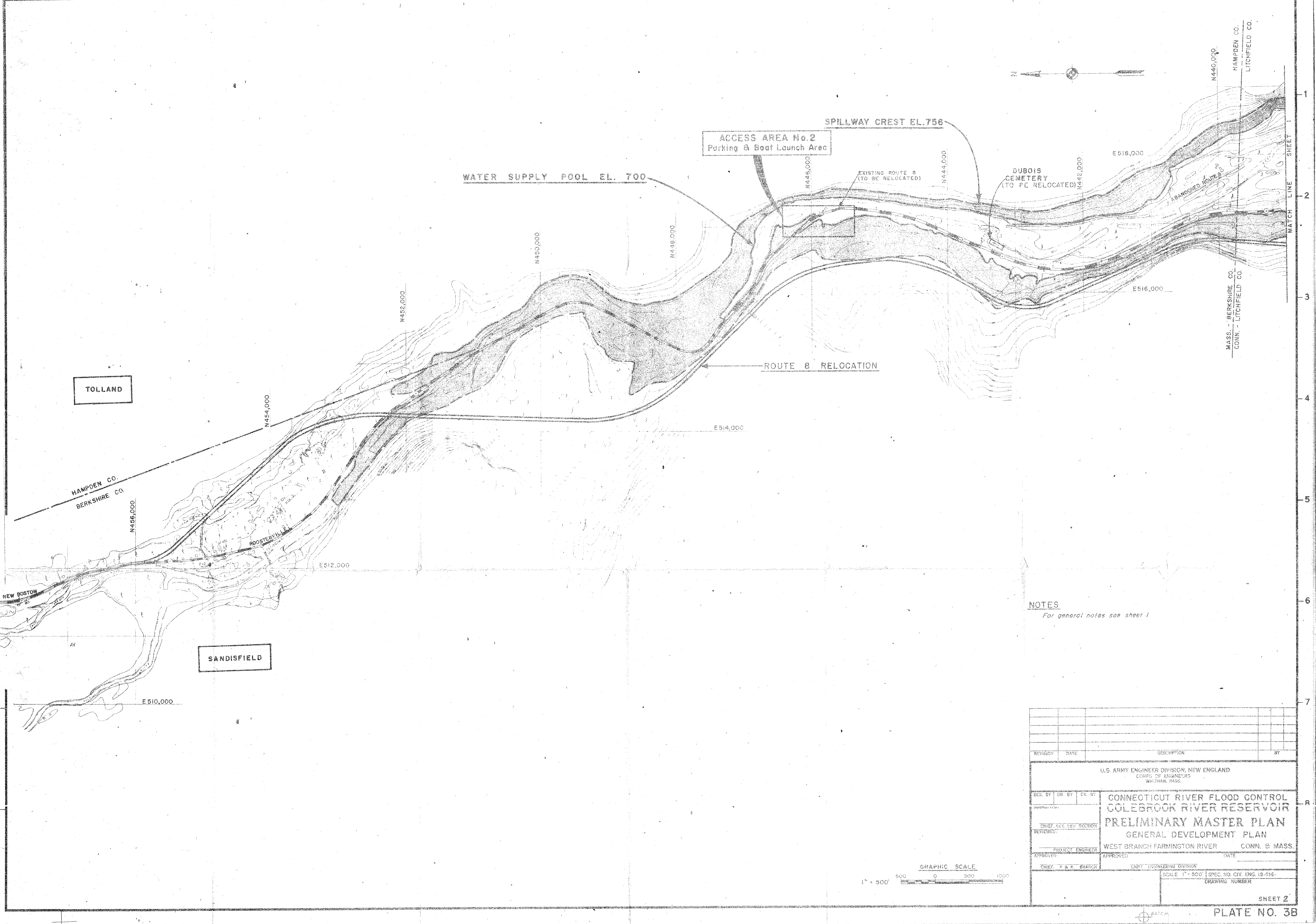


NOTES
Elevations refer to Mean Sea Level Datum.
Contour interval equals 5 feet.
Topography based on photogrammetric survey.
Grid system is Connecticut Lambert conformal.
Aerial Survey made when West Branch Reservoir was at El. 600 ±. Existing ground at proposed Dam Site = El. 567.

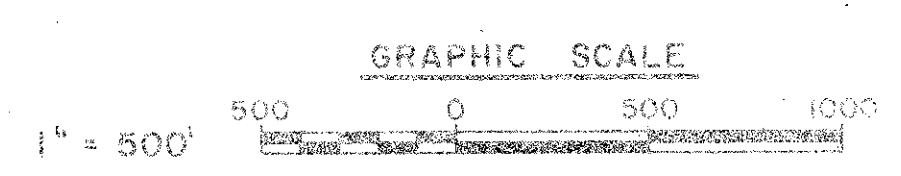
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U.S. ARMY ENGINEER DIVISION, NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.						
DES. BY		DR. BY		CK. BY		CONNECTICUT RIVER FLOOD CONTROL COLEBROOK RIVER RESERVOIR PRELIMINARY MASTER PLAN GENERAL DEVELOPMENT PLAN WEST BRANCH-FARMINGTON RIVER CONN. & MASS.
SUBMITTED:						
CHIEF, RES. DEV. SECTION						
REVIEWED:						
PROJECT ENGINEER						APPROVED: DATE
CHIEF, P. & R. BRANCH						CHIEF, ENGINEERING DIVISION
						SCALE 1" = 500' SPEC. NO. CIV. ENG. 19-016- DRAWING NUMBER



COLEBROOK R 6306-136



NOTES
For general notes see sheet 1



REVISION	DATE	DESCRIPTION	BY

DES. BY			DR. BY			CK. BY		
U.S. ARMY ENGINEER DIVISION, NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.								
CONNECTICUT RIVER FLOOD CONTROL COLEBROOK RIVER RESERVOIR								
PRELIMINARY MASTER PLAN								
GENERAL DEVELOPMENT PLAN								
WEST BRANCH FARMINGTON RIVER CONN. & MASS.								
APPROVED: PROJECT ENGINEER			APPROVED: CHIEF ENGINEERING DIVISION			DATE		
CHIEF "P & R" BRANCH			CHIEF ENGINEERING DIVISION			SCALE 1" = 500' (SPEC. NO. CIV. ENG. 19-016)		
						DRAWING NUMBER		
						SHEET 2		